Enrollment No: Exam Seat No:

C.U.SHAH UNIVERSITYSummer Examination-2017

Subject Name: Optics

Subject Code: 4SC04PHC1 Branch: B.Sc. (All)

Semester: 4 Date: 24/04/2017 Time: 10:30 To 01:30 Marks: 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

Q-1		Attempt the following questions:	(14)
	a)	State a difference between transmission and reflection gratings	1
	b)	Write the characteristics of Corpuscles	1
	c)	How is Fresnel's diffraction different from Fraunhofer?	1
	d)	State Fermat's Principle of least time.	1
	e)	Give the definition for Zone Plate	1
	f)	Define in general the term Resolving Power	1
	g)	State Huygens Principle	1
	h)	Under what condition Rayleigh's criterion of resolution is achieved?	1
	i)	Give the condition for Diffraction	1
	j)	Give the definition of Interference	1
	k)	Define Grating element	1
	1)	Define the term Diffraction	1
	m)	Write the expression for focal length of a zone plate	1
	n)	Draw the figures for divergent and convergent wavefronts.	1
Attem	pt any f	our questions from Q-2 to Q-8	
Q-2		Attempt all questions	(14)
	a)	Describe Huygens theory of propagation of wave front in detail.	7
	b)	Determine the laws of reflection at plane surface using Fermat's principle.	7
Q-3		Attempt all questions	(14)
	a)	Explain the construction of Zone Plate with suitable figures	7
	b)	State 5 points of difference between Fresnel and Fraunhofer diffraction	7
Q-4		Attempt all questions	(14)
	a)	Explain in detail Fresnel's theory of rectilinear propagation of light.	7
	b)	Write a note on Action of Zone Plate.	7
Q-5		Attempt all questions	(14)
	a)	Explain the theory of Plane transmission grating	7
	b)	A zone plate has a focal length of 70cm at a wavelength 6000Å. What is its focal length at 7000Å?	4
	c)	Give the expression for resolving power of a telescope; also mention how can	3



		you improve the resolving power of a telescope?	
Q-6		Attempt all questions	(14)
	a)	Give the differences between dispersive and resolving power of a grating.	7
	b)	Deduce the expression for resolving power of a microscope	7
Q-7		Attempt all questions	(14)
	a)	Discuss the method of determining wavelength of a spectral line using transmission grating.	8
	b)	Differentiate between Zone plate and convex lens	6
Q-8	,	Attempt all questions	(14)
	a)	Explain in detail Rayleigh's Criterion for resolution.	8
	b)	A grating has 6000 lines per cm. Find the angular separation of two yellow lines of mercury of wavelengths 5770Å and 5791Å in the second order	6

